



FORESCENE Workshop
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Modelling scenarios towards a sustainable use of natural resources in Europe

Results from the “MOSUS” project

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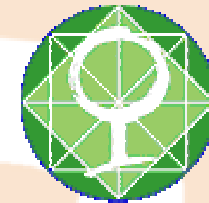




www.mosus.net

Is Europe sustainable? Modelling opportunities and limits for restructuring Europe towards sustainability

- Funded by the **5th Framework Programme** of the European Union (sub-programme environment and sustainable development)
- Endorsed by the Industrial Transformation Project of the **International Human Dimensions Programme (IHDP-IT)**



The extended GINFORS model

GINFORS (Global Interindustry Forecasting System),
By Institute for Economic Structures Research (GWS)

Multi-country (56 countries/world regions), multi-sectoral
(41 sectors) input-output model system, including
international trade and energy use / CO₂ emissions

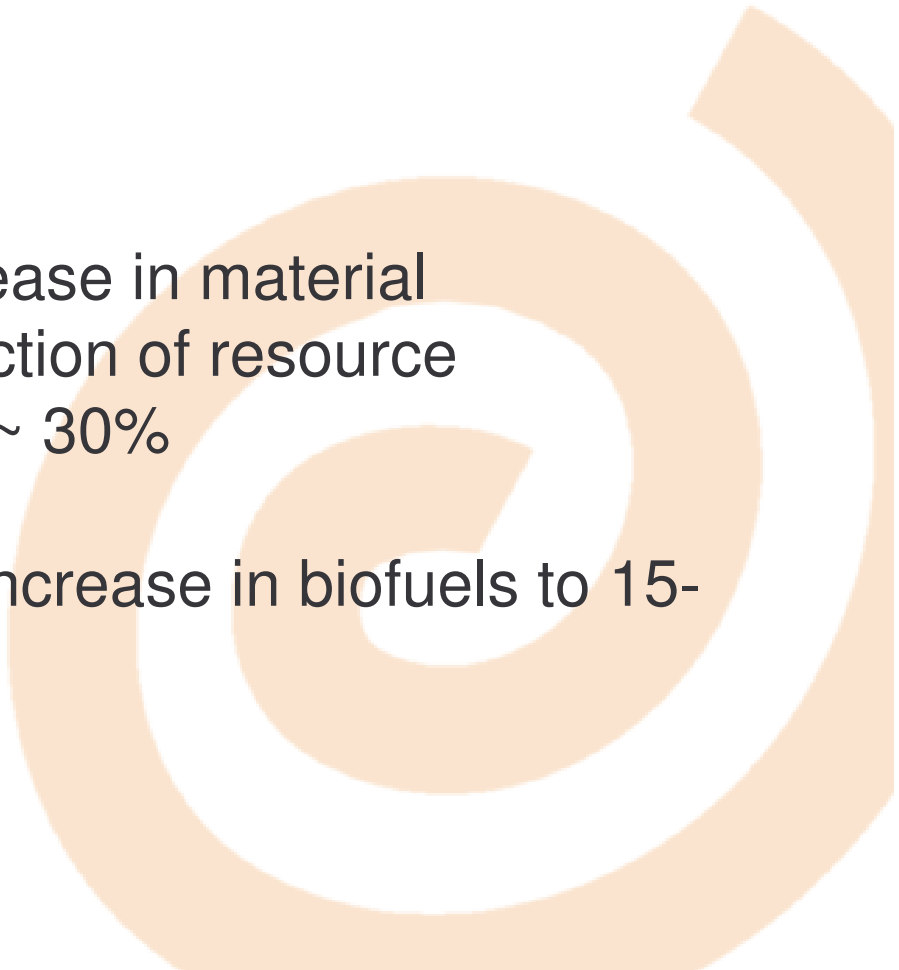
Extended by material input database (188 countries,
1980 – 2002)

Extended by new models of consumption behaviour

Goals and targets: natural resources

3 Scenarios: **BASE, LOW, HIGH**

HIGH Scenario

- + **Material use:** significant increase in material productivity – absolute reduction of resource extraction (Factor 10 path); ~ 30%
 - + **Energy:** reduction of TPES; increase in biofuels to 15-20% in TPES
 - + **CO2:** post-Kyoto reductions
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6 packages of policy measures

| | LOW | HIGH |
|--|---|------------------|
| (1) Technical Change | Assumptions on sectoral changes starting in 2010 | |
| (2) Transport costs | + 5% until 2020 | + 10% until 2020 |
| (3) (a) Higher levels of metal recycling | + 0.1% p.a. | + 0.3% p.a. |
| (b) Higher efficiency of non-metallic minerals | + 0.2% p.a. | + 0.4% p.a. |
| (4) Increase in material productivity in basic industry sectors ("Aachen scenario") | + 10% until 2020 | + 20% until 2020 |
| (5) (a) R&D of Firms | Subsidised with 1% of public consumption between 2006 and 2010 | |
| (b) Technical Progress | Total factor productivity (excl. labour productivity) increases by 0.15% p.a. | |
| (6) Emission trading | Target: Kyoto | Target: IPCC |
| (a) Changes in consumption structures | Based on Kratena and Wöger (2004) | |
| (b) CO ₂ tax prices in 2020 | 40 €/t | 120 €/t |
| (c) Share of biofuels in 2020 (exogenous) | 8-10% | 15-20% |

Economic development and energy use

Economic growth:

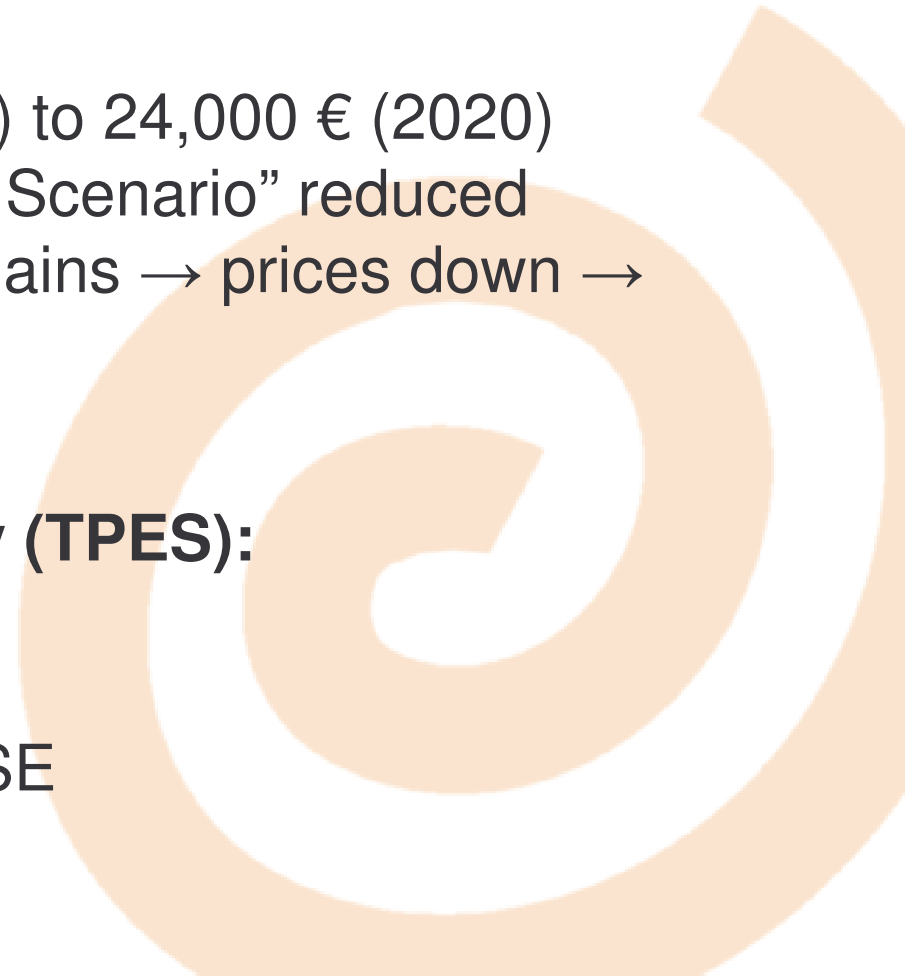
BASE: 18,000 € / capita (2005) to 24,000 € (2020)

HIGH: + 4% (2020) – “Aachen Scenario” reduced material costs → productivity gains → prices down → profits up → economic growth

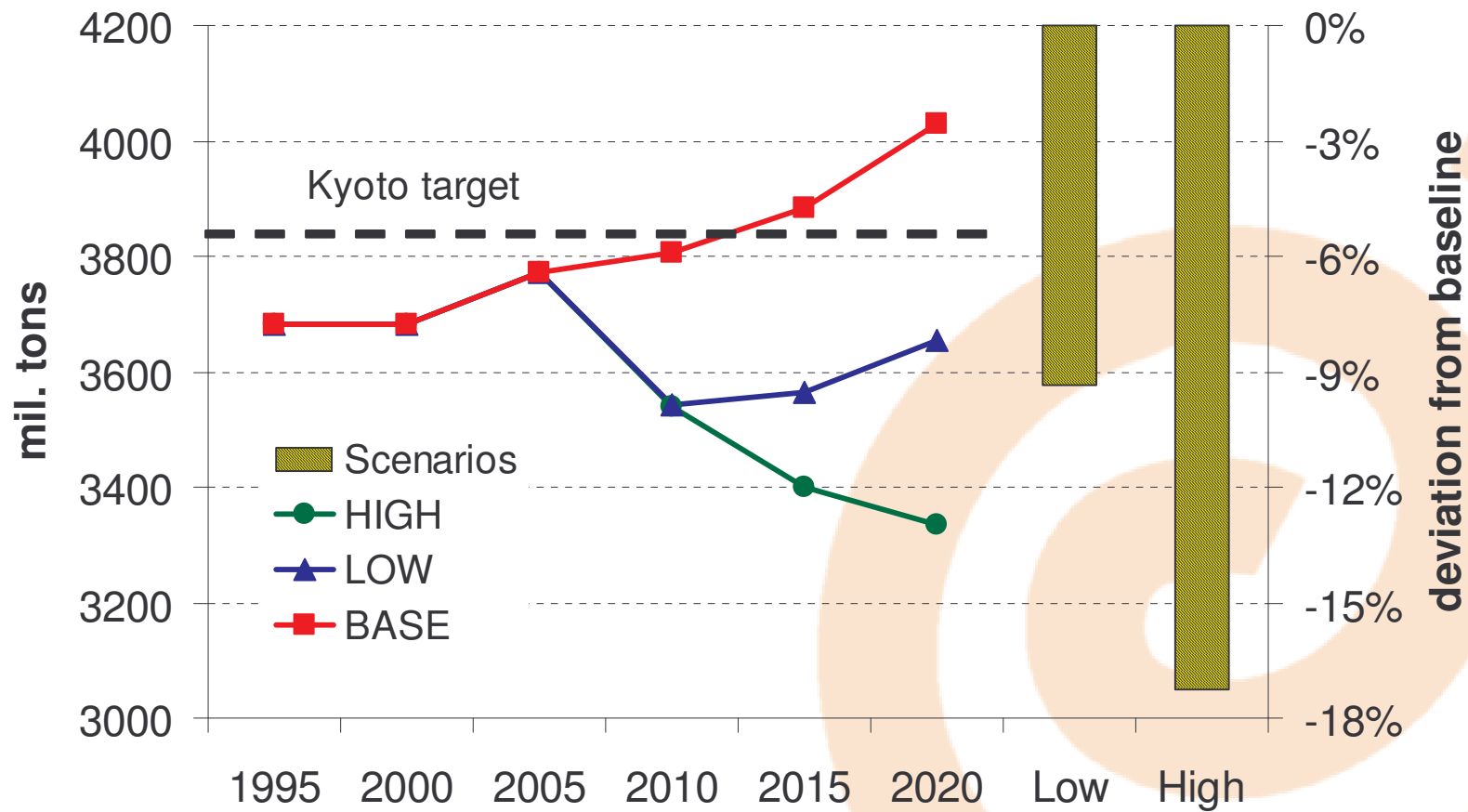
Total Primary Energy Supply (TPES):

BASE: + 16% (2005 → 2020)

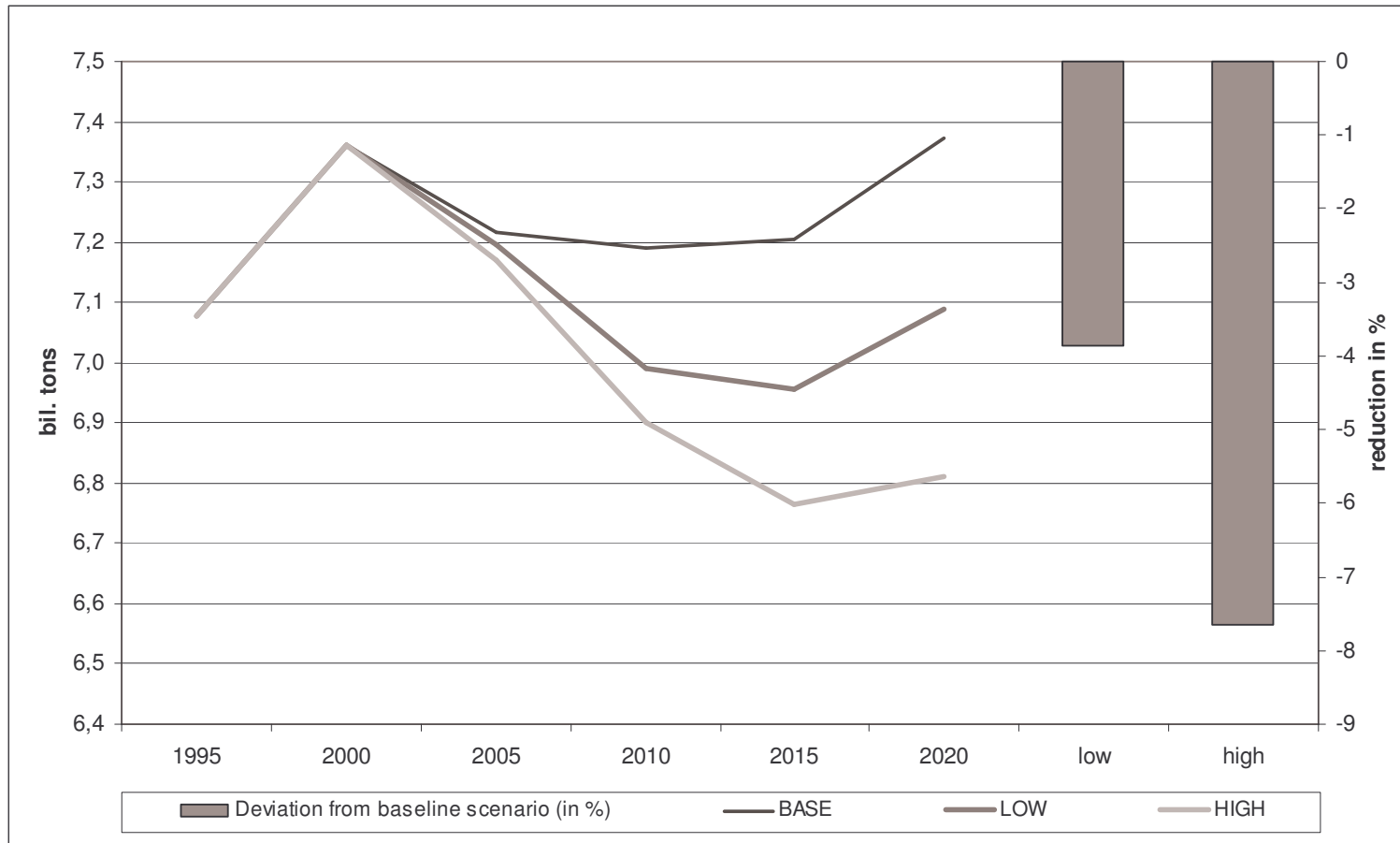
HIGH: - 10% compared to BASE



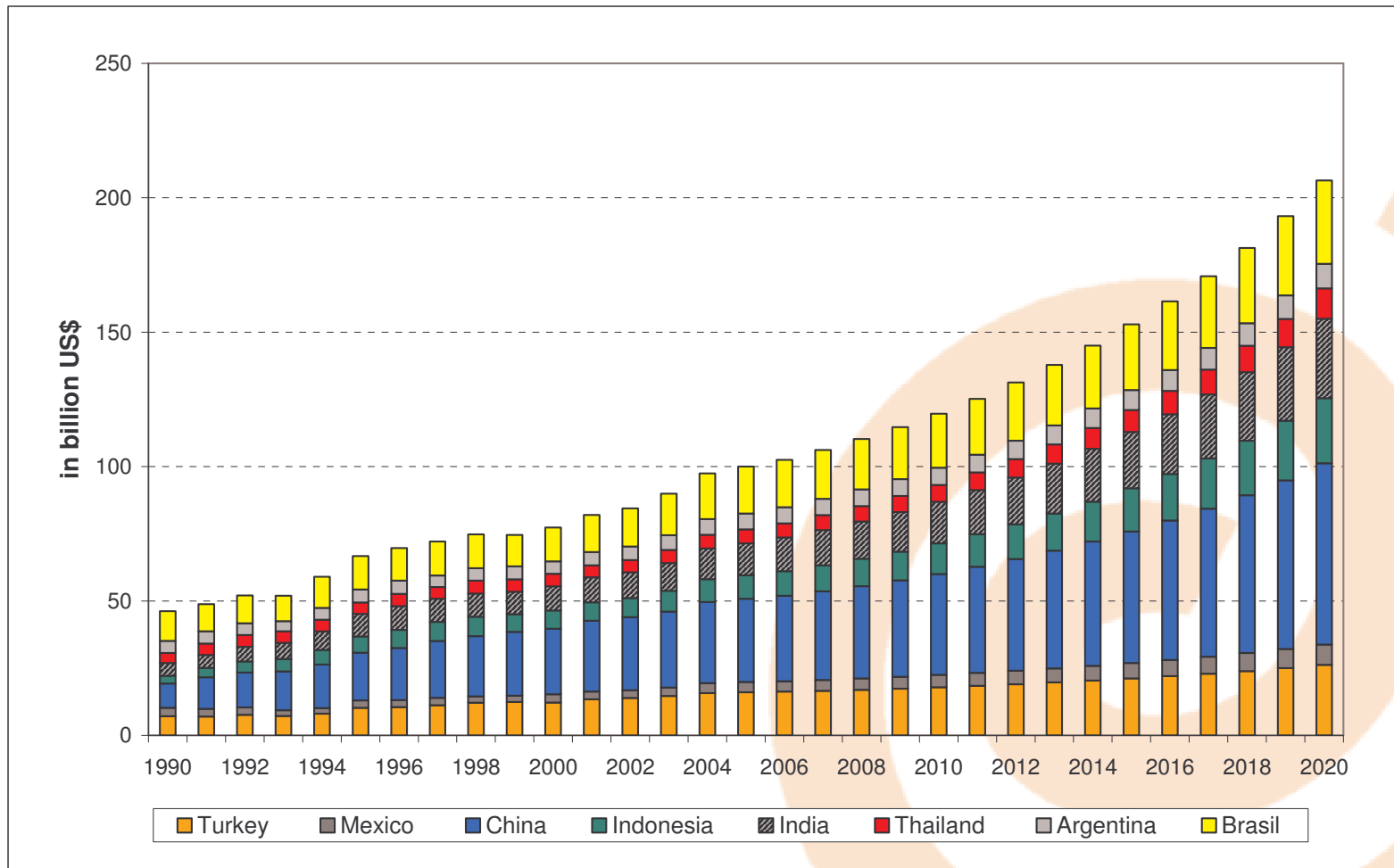
CO₂ emissions (3 scenarios)

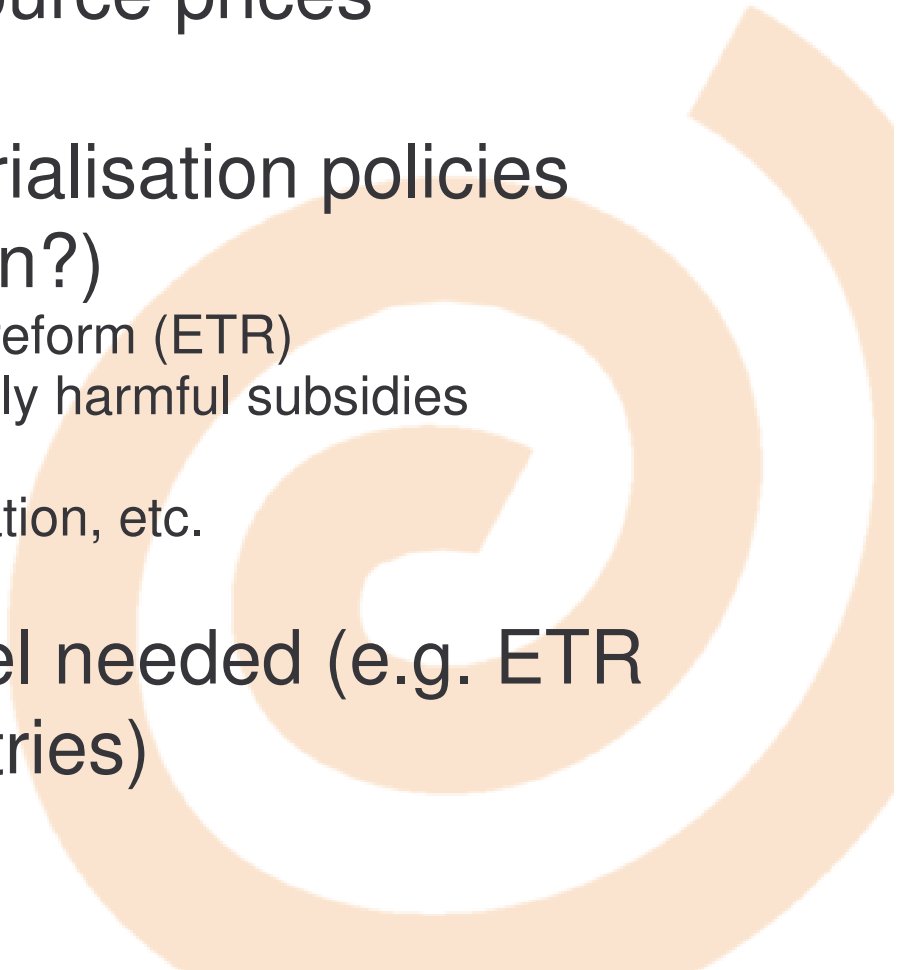


Domestic material extraction (3 scenarios)



EU-25: Resource intensive imports from “Anchor countries”



- Win-win situation for economy & environment
 - Rebound effects → resource prices
 - More ambitious dematerialisation policies required (beyond win-win?)
 - Europe-wide ecological tax reform (ETR)
 - Elimination of environmentally harmful subsidies
 - Green public procurement
 - Support for public transportation, etc.
 - Action on the global level needed (e.g. ETR also in developing countries)
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The end.....thank you !

More information:

www.mosus.net

www.materialflows.net

MoSUS 

www.materialflows.net
The online portal for material flow data

